

**A KEY TO THE NYMPHS OF MIDWESTERN
LYGAEIDAE (HEMIPTERA: HETEROPTERA).**

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The immature stages of Nearctic Hemiptera have been neglected to a considerable extent by most workers on the order. This neglect may have a two-fold origin. First, is the untenable belief that in paurometabolous orders the nymphal and adult stages may be identified through the use of adult characters. While this is occasionally true one has only to examine a nymph of, say, *Paromius longulus*, to see that the use of adult characters would be insufficient even to place the species in the correct tribe. The second reason for the neglect of the nymphal stages has been the necessity for special methods of preservation, usually considered burdensome by the conventional collector.

Due to the lack of adequately preserved material the key presented below is incomplete. Twenty-six genera are keyed, two of which, *Paromius* and *Oxycareneus*, are extra-limital for the upper Mississippi Valley region. The key is based upon nymphs of the fifth, or ultimate, instar there being insufficient material available of the earlier instars to make analysis of them possible at the present time. In all of the subfamilies except the Oxycareninae and Rhyparochrominae the key includes all genera likely to be found in the area. In the Oxycareninae no nymphs of the American genus *Crophius* have been available. However, I have included in the key the type genus *Oxycareneus*, as represented by an African species, in the hope that our genus may run close to it. The large subfamily Rhyparochrominae is very inadequately represented. Nymphs of only ten of the some twenty-two midwestern genera have been available to me for study. Therefore this section of the key will be of limited value until it becomes possible to subsequently expand it.

The recognition of instars is an important factor in working with immature forms. The instars of hemipterous nymphs, in general, are rather easy to recognize due to the remarkable constancy of the development of the wing pads throughout nymphal life. In the first and second instars the wing pads are absent and I have not been able to arrive at a generalization that will separate these from one another. In the first instar the head and antennae are always, so far as I know, much larger relative to the thorax and abdomen than is the case in the second instar. Furthermore, in several species examined the pro-thorax is larger relative to the

two succeeding segments than is the case in the second instar (Figures 1 and 2). Therefore, when a series representing five stages of the same species is at hand the first and second instar nymphs can usually be readily separated from one another. The following key to the instars is adapted from a paper on the nymphs of *Catorhintha mendica* (Slater 1943) and will work for immature Lygaeidae and for members of a number of other families as well. Nearly all hemipterous species pass through five instars during nymphal development.

KEY TO THE INSTARS.

- 1. Mesothoracic wing pads absent (Figs. 1 & 2) .. INSTARS I & II
 Mesothoracic wing pads present 2
- 2. Mesothoracic wing pads not extending caudad to the posterior margin of the metanotum (Fig. 3) INSTAR III
 Mesothoracic wing pads extending caudad onto the abdominal tergum 3
- 3. Mesothoracic wing pads not extending caudad to the posterior margin of the second abdominal tergite (Fig. 4).

INSTAR IV

Mesothoracic wing pads extending caudad at least onto the third abdominal tergite (Fig. 5) INSTAR V

Preservation: To obtain satisfactory specimens liquid preservative is necessary. I have found for most species that killing in a K.A.A.D. mixture, as described by Peterson (1948) is very satisfactory. Specimens should be removed from the mixture in a few hours and placed in either 70 or 95% ethyl alcohol. Adequate results may usually be obtained also by dropping specimens directly into alcohol to which a little formalin has been added.

In most cases nymphs of only certain species of a given genus have been available for study. I have indicated below the half couplet, where a genus is keyed out, what species have been studied of that genus.

KEY TO THE GENERA OF KNOWN FIFTH INSTAR NYMPHS OF MIDWESTERN LYGAEIDAE.

- 1. Three abdominal scent gland openings present, one each on anterior margins of tergites four, five, and six 2
 Two abdominal scent gland openings present, one each on anterior margins of tergites four and five, or five and six. 14
- 2. Basal segment of hind tarsus longer than apical segment .. 3
 Basal and apical segments of hind tarsus subequal, or apical segment longer than basal 12

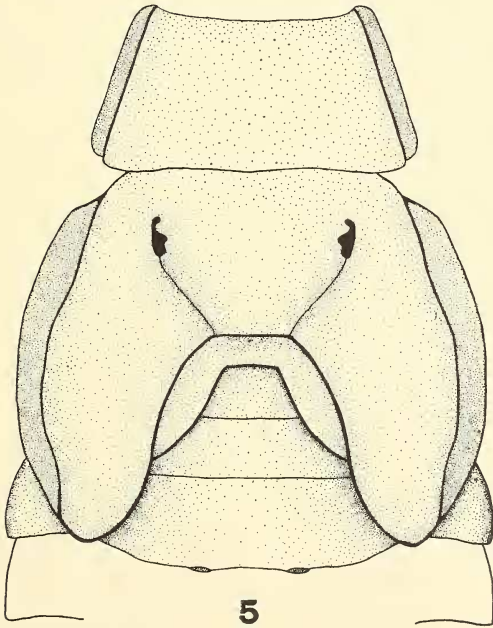
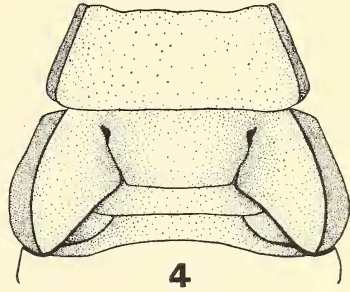
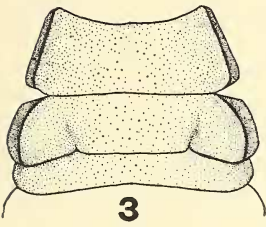
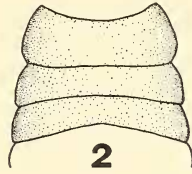
3. Antennal segments two and three subequal (*L. diffusus* (Uhler)) LIGYROCORIS Stal.
 Antennal segment two longer than segment three 4
4. Epicranial stem (coronal suture) longer than either arm (*M. serripes* Olivier) MYODOCHA Latr.
 Epicranial stem shorter than either arm, or lacking 5
5. Basal segment of hind tarsus more than twice length of apical segment 6
 Basal segment of hind tarsus less than twice length of apical segment 7
6. Length of second antennal segment one-fourth or more greater than width of head across eyes; length of pronotum much more than three-fourths length of mesothoracic wing-pads (*C. mavortius* (Say)) CNEMODUS H.S.
 Width of head across eyes greater than length of second antennal segment; length of mesothoracic wing pads more than one-fourth greater than length of pronotum (*S. insignis* (Uhler)) SPHAEROBIUS Uhler
7. Length of second antennal segment more than twice the width of the interocular space (*O. picturata* Uhler).
 OZOPHORA Uhler
 Length of second antennal segment less than twice the width of the interocular space 8
8. Transverse constriction on basal one-fourth of pronotum, very weak or lacking, not attaining the lateral margins, exclusive of the explanate edge (*U. floralis* (Uhler)).
 UHLERIOLA Horv.
 Transverse constriction on basal one-fourth of pronotum always attaining the lateral margins, exclusive of the explanate edge 9
9. Fourth antennal segment never more than twice the length of segment one (*H. plebejus* Stal) HERAEUS Stal.
 Fourth antennal segment always considerably more than twice the length of segment one 10
10. Length of abdomen from apex of mesothoracic wing pads to apex of abdomen subequal to, or greater than length of pronotum and mesothoracic wing pads combined (*P. longulus* (Dallas)) PAROMIUS Fieb.
 Length of abdomen from apex of mesothoracic wing pads to apex of abdomen only slightly more than one-half length of pronotum and mesothoracic wing pads combined. (Note: This character may or may not separate *Paromius* from some of the more elongate species of *Pachybrachius* from the southern states) 11

11. Length of second and fourth antennal segments subequal; rostrum extending caudad at least to the mesocoxae (*P. constrictus* (Say)) PERIGENES Distant
 Fourth antennal segment one-third longer than segment two; rostrum short, not extending caudad past the front coxae (*P. basalis* (Dallas)) PACHYBRACHIUS Hahn.
12. First and second antennal segments subequal in length (*S. thomsoni* Reuter) SCOLOPOSTETHUS Fieb.
 Second antennal segment longer than first segment (9:7) 13
13. Second and third antennal segments subequal in length, the third segment somewhat clavate in form (*P. nodosa* Say).
 PTOCHIOMERA Say
 Second antennal segment one-third longer than segment three, the third segment linear (*K. resedae* (Panzer)).
 KLEIDOCERYX Stephens
14. Fore femora swollen and armed below with short teeth . . 15
 Fore femora only slightly, or not at all, swollen, not armed below with teeth 17
15. First antennal segment longer than second; head, pronotum and mesothoracic wing pads coarsely punctate (*O. dorsalis* (Say), *O. crassimana* (Fabricius)).
 OEDANCALA A. & S.
 First antennal segment shorter than second; head, pronotum and mesothoracic wing pads impunctate 16
16. Rostrum long, reaching caudad onto second abdominal sternite (*Oxycarenus* sp.) OXYCARENUS Fieb.
 Rostrum short, not extending caudad to the middle coxae, usually barely exceeding the front coxae (*P. abbreviatus* (Uhler)) PHLEGYAS Stal
17. Suture between abdominal tergites four and five and five and six curving strongly caudad from lateral margins to meson 18
 Suture between abdominal tergites four and five and five and six straight, or only very slightly curving caudad to the meson 19
18. Eyes very prominent, not in contact with antero-lateral margins of pronotum; interocular space at most two and one-half times width of an eye; pronotum black with vertex dull testaceous (*H. piceus* (Say)).
 HYPOGEOCORIS Mont.
 Eyes less prominent, usually in contact with the antero-lateral margins of pronotum; interocular space three times width of an eye; pronotum variously colored, if black then the

- vertex of the head concolorous (*G. uliginosus* (Say), *G. punctipes* (Say), *G. bullatus* (Say)) GEOCORIS Fall.
19. Length of third antennal segment greater than interocular space (*O. fasciatus* (Dallas)) ONCOPELTUS Stal
 Interocular space greater than length of third antennal segment 20
20. Epicranial stem (coronal suture) absent; arms meeting mesally at base of head. (In dried specimens care must be taken to see that the head has not been retracted into the pronotum making the base of the head invisible) 21
 Epicranial stem present, arms meeting anterior to base of head 23
21. Rostrum very long, reaching caudad at least to the second abdominal sternite (*B. numenius* (Say)).
 BELONCHILUS Uhler
 Rostrum much shorter, never exceeding the hind coxae and often only slightly surpassing the middle coxae 22
22. Pronotum conspicuously striped longitudinally with dark markings (*N. ericae* (Schilling), *Nysius* spp.).
 NYSIUS Dall.
 Pronotum heavily mottled, but never with conspicuous longitudinal striping (*O. scolopax* (Say)).
 ORTHOLOMUS Stal
23. Lateral margins of abdomen scalloped (*C. angustatus* Stal, *C. luridus* Stal, *C. discors* Horv., *C. robustus* Barber).
 CYMUS Hahn
 Lateral margins of abdomen not scalloped 24
24. Body slender, elongate, not ovoid; three apical abdominal tergites more darkly colored and appearing more heavily sclerotized than the preceding tergites (*I. falicus* (Say), *I. macer* Van Duzee) ISCHNODEMUS Fieb.

EXPLANATION OF PLATE I

All figures are of *Cymus angustatus* Stal. FIG. 1. Thoracic segments of first instar nymph. Dorsal view, × 36. FIG. 2. Thoracic segments of second instar nymph. Dorsal view, × 36. FIG. 3. Thoracic segments of third instar nymph. Dorsal view, × 36. FIG. 4. Thoracic segments and first abdominal segment of fourth instar nymph. Dorsal view, × 36. FIG. 5. Thoracic segments and three proximal abdominal segments of fifth instar nymph. Dorsal view, × 36.



- Body more robust, not slender and elongate; apical abdominal tergites not more darkly colored nor more heavily sclerotized than preceding tergites 25
25. Spiracle of abdominal segment seven dorsally located (*L. kalmii* Stal, *Lygaeus* spp.) LYGAEUS Fabr.
- Spiracle of abdominal segment seven ventrally located (*B. leucopterus* (Say), *B. iowensis* Andre, *Blissus* spp.).
BLISSUS Burm.

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NOTICE

The Department of Engineering Physics of Cornell University, Ithaca, New York will give a special course in "Techniques and Applications of the Electron Microscope" from July 9 to July 21, 1951.

The course is designed for those research workers who have recently entered the field of electron microscopy. Further inquiries should be addressed to Professor Benjamin M. Siegel, Rockefeller Hall, Cornell University, Ithaca, New York.